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SUCCESSFULLY TREATED BY TYING THE ARTERY

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By JAMES WARDROP, Esq.

SURGEON EXTRAORDINARY TO THE KING.

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Read July 5th, 1825.

THOSE cases of aneurism wherein it is impracticable to put a ligature on the artery between the tumour and the heart, have hitherto been deemed incurable; and the cases are by no means very rare in which aneurismal tumours of the carotid, subclavian, and iliac arteries, extend beyond the reach of the knife, and the patient has been left to die under the most distressing circumstances.

As in those cases where the aneurism has been cured either spontaneously, or by tying the artery between the tumour and the heart, the curative process has been effected by the coagulation of the

blood contained in the tumour, it is remarkable that surgeons should not have taken advantage of the knowledge of this fact, and in those cases where the artery could not be tied between the tumour and the heart, have tied it *beyond* the tumour.*

If we suppose a case of femoral aneurism in the middle of the thigh, it is easy to conceive that when the ligature of the artery at a distance from the tumour was first contemplated for the cure of that disease, it might have been a matter of dispute whether the ligature ought to be applied below or above the aneurismal tumour ; for it is just as easy to imagine that the blood contained in the space between a ligature placed below an aneurismal tumour and the first arterial ramifications above the tumour should coagulate, as that the blood contained in the space between a ligature placed above the tumour and the first anastomosing branch below it, should undergo the process of coagulation. Besides, there are even advantages that might have been anticipated by tying the artery beyond the tumour, in such a case. In the

* I have used this circumlocution for the sake of perspicuity ; the words *above* and *below* having a totally different meaning, in reference to different arteries. Thus, tying the artery *above* the tumour in an aneurism of the femoral artery, implies between the tumour and the heart : while in an aneurism of the carotid artery, tying the artery *above* the tumour, implies *beyond* the tumour, or nearer to the *atlantal aspect*, agreeably to the ingenious language of Dr. Barclay's Nomenclature.

first place, the danger of secondary hemorrhage at the place of tying the ligature would be less, from the little resistance it would, at that part of the vessel, be required to make to the impulse of the blood, in comparison to what would be necessary were the ligature placed between the tumour and the heart. In the second place, every collateral branch between the tumour and the heart would be saved, to carry on the future circulation; branches which must be obliterated were the artery tied at some distance above the tumour.

This reasoning did not escape the ingenious Desault,* but he never made any practical application of it; and except in a deplorable case of aneurism of the femoral artery, unsuccessfully treated by Deschamps, and in another unfavourable instance in the iliac artery, operated on by Sir A. Cooper,† I know of no others where the practice has been adopted. It therefore appears to me that the subsequent account of a case of carotid aneurism, wherein the artery was successfully tied beyond the aneurismal tumour, in place of the common operation of tying the vessel between the tumour and the heart, is particularly deserving of notice, as it serves to establish an important point in the treatment of aneurism, and may often be the means of saving life under

* *Œuvres Chirurgicales de Desault*, par Bichat, tom. ii. p. 569.

† See Hodgson's excellent *Treatise on the Diseases of Arteries*.

circumstances in which the art of surgery has hitherto been deemed unavailing.

A lady, 75 years of age, after a very violent fit of coughing, perceived a swelling on the right side of her neck, a little above the clavicle. When I saw her eight days afterwards, the tumour had all the characters of an aneurism of the carotid artery, and had become as large as a fist; but was so situated that it was quite impracticable to tie the vessel below the tumour, so closely did it come in contact with the clavicle. The tumour continued to increase in size, and on the eleventh day after it was first observed, it had acquired a formidable aspect, the scapular portion having become very red and painful, the pulsation, which was very strong throughout the whole swelling, being here particularly so, and the parietes feeling extremely thin, and as if ready to burst.

It was evident that the patient's life was now in the most imminent danger, and in this hopeless condition it forcibly struck me, that it might be highly expedient to tie the carotid artery above the aneurism, in the hope that, by thus stemming the current of blood through the vessel, nature might establish a new channel to carry on the circulation, allow the blood in the tumour to coagulate, and the sac and vessel to contract and be obliterated, as after the common operation. There were circumstances which made

this case particularly favourable for resorting to such a measure ; the aneurism had been of short duration, the patient, though far advanced in years, had a healthy constitution, she was of a tranquil disposition, and eager that something should be done for her relief. Besides, the diseased artery was most favourable for the proposed operation ; for as no branches are sent off from the carotid artery until it divides into the external and internal, the process of coagulation would not be interrupted by the continuance of circulation through collateral branches in immediate contiguity with the aneurism. The operation also appeared practicable in this instance, as the aneurism, though large, extended upwards so as still to leave sufficient space for the application of a ligature between the tumour and the division of the artery.

Under these impressions, and with the approbation of Dr. Veitch and Mr. Glen, who also attended the patient, I undertook the operation, and the result of it has, in my opinion, fully authorised the measure ; and I trust that the future experience of others will confirm its utility. The operation consisted in making an incision through the skin and cellular membrane, rather more than an inch and a half in length, commencing it immediately above the tumour, and extending it on the tracheal edge of the mastoid muscle, and in the direction of the carotid artery, taking care to avoid

the large superficial veins. The subsequent part of the dissection was chiefly made with a silver knife, guided by the finger, and there was no particular difficulty in reaching the artery but what might have been anticipated, from its great depth, from the necessary limits of the incision, and from the numerous large veins which were carefully to be avoided—particularly a branch which extended across the middle of the incision to the internal jugular, and which consequently diminished the space in which the artery was to be taken up. After a careful dissection, which was tedious from its being necessary to tear the parts with the silver knife, the artery was so completely separated from the adjacent parts, that the point of the finger could be readily passed between the vessel and the vertebræ, and the aneurismal needle was passed round the artery with singular facility, taking care to avoid the par vagum, which was distinctly felt behind the finger. The vessel being previously ascertained to be healthy, one ligature was tied round it, as close to the tumour as the incision would admit, and the lips of the wound were stitched together by a suture, without any farther dressings. The aneurismal tumour was covered with adhesive plaster, in order to protect the tender skin, and at the same time to keep up a certain degree of pressure.

I thought it probable that the resistance to the circulation, which the ligature would neces-

sarily occasion, might, for a short while at least, after its application, be followed by an increase in the distension of the tumour; instead of which, however, there was an immediate decrease in its bulk, marked by a considerable corrugation of the skin at the base, as well as a diminution of its redness. The ligature of the artery did not seem to produce any change in the mental functions, or any unnatural feelings in the head; on the contrary, the patient passed the night after the operation more comfortably than that previous to it, the tumour being accompanied with less uneasiness.

A progressive diminution in the bulk of the aneurism, and in the strength of its pulsations took place, so that on the fourth day after the operation it seemed to have diminished nearly one-third in its bulk; the upper and tracheal portions had lost all pulsation, and only the scapular portion retained an obscure undulatory thrill. The integuments, which had lost their redness, now evidently became more inflamed, and during the fifth and sixth days there was a distinct increase in the size of the tumour, and it pulsated more strongly, which seemed partly owing to several severe fits of coughing. This apparently unfavourable change was, however, followed by a decided amendment; and eight days after the operation the swelling again began to diminish, and the pulsation became more obscure, so that on the fourteenth day it was

not much larger than half its bulk at the time of the operation, and no pulsation could be detected in any portion of it; merely a slight vibration in some parts, which seemed to be produced by the pulsations of the contiguous vessels which were now enlarged, particularly the inferior thyroid artery.

The redness of the skin, however, continued to increase and that of the scapular portion of the tumour to become more and more of a purple colour, till, at last, ulceration commenced on the most prominent part. Several considerable-sized portions of coagulated blood were discharged along with some healthy pus through the ulcerated opening; and on the 20th day after the operation, the ulceration of the integuments had closed, and nothing of the tumour remained, but some wrinkling of the skin, and a considerable degree of thickening of those parts on which the base of the tumour had rested. These continued to diminish, and at the end of the fifth week, from the time of the operation, the neck had nearly resumed its natural form, a slight degree of inequality only remaining; the ligature had come away, and the patient's general health, to which the greatest care had been paid, was completely re-established.

This case appears to me to prove satisfactorily, the possibility of the success of this mode of operating for aneurism, and of the important advan-

tages which are likely to be derived from it, more especially in those cases which have hitherto been considered beyond the aid of surgery.

The operation may also, under particular circumstances, be preferable to tying the ligature between the aneurism and the heart, even in cases where that operation is practicable. For as in that which I have just narrated, had it even been possible to have tied the artery between the tumour and the heart, how much more dangerous and difficult would the operation have been, and how much greater would have been the risk of secondary hæmorrhage at the place of the ligature.

The only circumstance which must be considered as indispensable to the success of this mode of operating is, that there be no vessel arising, either from the sac itself, or from the artery between the sac and the ligature, sufficiently large to keep up the circulation of the blood through these parts, and thus prevent its coagulation. I say sufficiently large, for it is perfectly ascertained that after the common operation of tying the artery between the tumour and the heart, pulsation to a certain degree often continues for some time, notwithstanding which, neither the gradual process of coagulation in the tumour is prevented, nor the subsequent contraction and condensation of the aneurismal sac and insulated portion of the artery.

When an aneurism is cured spontaneously, it is evident that in general the process must in like manner be slow; and that the circumstance of the circulation through the tumour being rendered languid, equally suffices to admit of the blood coagulating, as if circulation was completely stopped.

These considerations lead me therefore to hope, that the operation of tying the artery beyond the aneurism will, in many instances, be successful, even though the current of blood through it be not completely stemmed. To ensure, however, this being done, the ligature should be made as close to the tumour as possible, in order to preclude the chance of leaving a branch between the tumour and the ligature, which would carry on the circulation; and I can even conceive cases wherein it might be practicable to tie such branch separately, so as effectually to prevent the circulation being carried on through the aneurism.

Charles Street, St. James's Square,
July 1, 1825.